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# EPAct Light Duty Fuel Effects Test Program

Oil-PM Pilot Study  
And  
PM Speciation Program

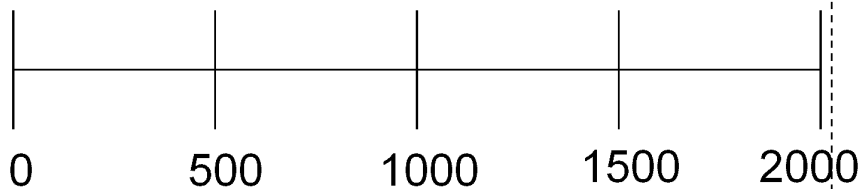
January 15, 2008

## *EPAAct Oil-PM Pilot Study*

- Objective 1: Define duration of engine oil conditioning needed to stabilize the effect of oil volatility on PM emissions
- Objective 2: Define the impact of lubricant interaction with fuel ethanol on PM emissions
- Results to impact Phase 3 of EPAAct study at SwRI (July)
- Fuels: E0, E10, E20
- Test vehicles: 2006 Ford F-150 (Bin 8) and 2007 Toyota Camry (Bin 5) from EG&G fleet
  - 4,000-20,000 miles on the odometer
- Lubrizol Corp. will provide oil and oil analysis

# Test Plan

Phase 1: Mileage accumulation      Phase 2: Ethanol Test



E0

•At each 500 mile interval:

- 5 Cold start LA92 tests conducted
- Oil sample collected for analysis

E10

(5 LA92 tests)  
(Oil sampled)

E20

(5 LA92 tests)  
(Oil sampled)

2 Tier 2 vehicles tested  
Total # of tests = 50  
Phase 1 Timing: Feb - May

2 Tier 2 vehicles tested  
Total # of tests = 20  
Phase 2 Timing: May

## *EPA Act Oil-PM Pilot Study* *(Cont'd)*

- Same driver used for all tests on a given vehicle
- Measured parameters: THC, NMHC, NO<sub>x</sub>, CO, CO<sub>2</sub>, PM, EC/OC and engine oil temp. in sump
- Oil analyzed for volatility and ethanol content
- Total number of LA92 tests: 70
- Mileage accumulation on dynamometer
- Estimated duration of pilot: 15 weeks (May 11)

# Ex. 4 - CBI

## *Use of LOD vs. Contract Lab*

### Pros

- Lowest cost
- Highest degree of control
- High data quality
- Earliest start date for pilot program

### Cons

- No binding contract
- Only one work shift

## Larger PM Speciation Study

- Fuel effects on PM mass, size and composition
  - Speciate semi-volatile VOC, metals and ions
- Same 3 RFS 2 fuels (E0, E10, E20) from phases 1 and 2 of main program
- 6 vehicles (+/-) similar to SwRI vehicles but not necessarily identical
- Timing: late 2008



## Challenges with PM Speciation

- Concerned that SwRI standard methods may only be qualitative
- We'd like to sample raw exhaust using a proportional flow system
  - Need to upgrade our AVL Toxic sampler for transient operation (SVOC)
  - Second sampler needed for PM filters (mass, metals and ions)
- Could be done at NVFEL or Contract lab

# Ex. 4 - CBI